The effects of stolen goods markets on crime: pawnshops, property theft, and the gold rush of the 2000s

Article (Accepted Version)

The Effects of Stolen Goods Markets on Crime: Pawnshops, Property Theft, and the Gold Rush of the 2000s

By Rocco d'Este*

First Version: April 2014
This Version: November 2019

This paper investigates the effects of stolen goods markets on crime. I focus on pawnshops, a legitimate business often associated with the illicit trade of stolen property. Within-county estimates reveal that a 10% increase in the rate of pawnshops increases, by around 0.3%, acquisitive crimes yielding loot that might be tradeable to pawnshops. A quasi-experimental design shows that the effects of changes in gold prices on burglaries are amplified by the initial stock of pawnshops in a county. Overall, the analysis suggests that a larger market for the trade of stolen property can affect burglars' incentives by increasing the value of criminal opportunities.

Keywords: stolen goods markets, pawnshops, gold prices, criminal opportunities
JEL Codes: K14, K42

• University of Sussex, Department of Economics (e-mail: r.d-este@sussex.ac.uk). A previous version of this work has been circulated with the title: "The Effect of Stolen Goods Markets on Crime: Evidence from a Quasi-Natural Experiment."

1. Introduction

Acquisitive crimes impose a substantial cost to society. In 2010, the United States experienced one theft every forty seconds, with a total of 9.5 million crimes and an estimated economic loss for the victims of around $16 billion (Federal Bureau of Investigation 2010). Personal items were stolen in almost 85% of criminal cases, suggesting that burglars need markets where to convert stolen goods into cash (Walters et al. 2013). In particular, this raises the hypothesis that the availability of stolen goods markets may increase the value of criminal opportunities—and consequently the level of illicit activity—by reducing theft-related transaction costs and by increasing the expected returns from crime (Sutton 2010). While seemingly important, the relationship between markets for stolen goods and theft crimes has proven elusive to identify empirically. This appears to be due to the difficulty in measuring the presence of illicit underground markets, and to econometric concerns originating from their endogenous sorting to high-crime areas.

In this paper, I investigate the effects that stolen good markets have on crime by focusing on pawnshops—widespread legal businesses that offer cash to clients in exchange for personal property items. Critically for my work, these markets have often been associated with the fencing of stolen property (Sutton 2010). I argue that a larger presence of pawnshops in an area may incentivize criminal activity in a variety of ways. For instance, it may increase thieves' likelihood of finding an unaware or a complicit pawnbroker, allowing for a quick and inexpensive conversion of stolen goods into cash. Also, it may deter law enforcement's ability to monitor suspicious businesses where stolen goods are likely traded, and it may incentivize pawnbrokers' competition, increasing the profits that thieves can obtain for their wares. In this paper, I examine the net effects that pawnshops have on crime by assembling a novel crime-related panel dataset. This contains annual information on reported crimes, number of pawnshops, and a wide set of socio-economic controls in 1,899 US counties from 1997 to 2007.

The endogeneity of pawnshops to crime is first addressed by using the panel properties of the data, and then via a quasi-experimental design.

In the first part of the analysis I show that—conditional on county and year fixed effects—a 10% increase in the rate of pawnshops increases theft crime by around 0.3%. A balancing test lends credibility to the key identifying assumption of this empirical design, attenuating the concerns that variation in the presence of pawnshops may be correlated with local determinants of acquisitive crimes, such as socioeconomic conditions and credit availability, which are potentially unobservable to the researcher. Furthermore, placebo exercises show that the criminogenic effects are "well-timed" and that changes in pawnshops in future years do not affect criminal activity in current years. This mitigates the concerns that the estimates may be inflated by the endogenous sorting of pawnshops in areas where thefts are on the rise. The motivating hypothesis of the paper is also supported by falsification tests showing that the criminogenic effects are concentrated on theft crimes yielding loot that might be tradeable to pawnshops. Changes in the rate of pawnshops do not influence the theft of motors and vehicles, which are not generally accepted by this type of business. Similarly, I do not detect any effects of pawnshops on violent crimes.

I then exploit the growth in global gold prices, which generates a plausibly exogenous increase in the value of criminal opportunities for all burglars targeting gold items. Specifically, I posit that the increase in gold prices will cause more burglaries in areas with more pawnshops, that typically trade items such as rings, necklaces, and bracelets. With higher competition, the pass-through of an increase in gold prices to the thief may be larger. That is, business competition may lead pawnbrokers to pay more for gold items, providing extra incentives for the emergence of criminal activity in the area. Furthermore, a larger presence of pawnshops may reduce the transaction costs of crime by hindering law enforcement ability to monitor suspicious businesses and by decreasing the time needed by thieves to carry out an illegal

transaction. Hence, in areas with more pawnshops, the probability of apprehension while trading stolen property could be relatively lower, further amplifying the incentives to steal when gold prices display a large increase.

I explore these hypotheses interacting gold prices with the initial stock of pawnshops in a county, fixed to the first year of the sample. Notably, this design further addresses possible reverse causality due to the sorting of pawnshops in areas with increasing numbers of thefts. The analysis indicates that the initial stock of pawnshops in a county amplifies the effects that changes in gold prices have on burglaries. The estimates are robust against the inclusion of a rich set of baseline economic and demographic county variables interacted with gold prices, suggesting that the effects detected are closely related to the presence of pawnshops in an area, rather than to unobserved correlated factors. Also, an event study analysis supports the validity of this quasi-experimental design, showing criminogenic effects in counties with a larger initial presence of pawnshops emerging "on impact", when gold prices experienced a large and permanent increase. Overall, the results are consistent with the hypothesis that a larger market for the trade of stolen property can affect burglars' incentives by increasing the value of criminal opportunities

Ever since Becker's seminal work (1968), economists have investigated the determinants of crime using cost and benefit analysis. But, while extensive research has focused on incentives related to sanctions, deterrence, and legal labor market prospects, fewer papers have considered the sensitivity of acquisitive crimes to changes in the value of criminal opportunities (Draca and Machin, 2015). My findings suggest that pawnshops can raise the value of criminal opportunities by reducing the transaction costs faced by burglars when selling stolen items.[1]

[1] My paper is related to an unpublished PhD dissertation chapter by Thomas J. Miles (2007), who detects a positive effect of pawnshops on crime by analyzing a cross-section of US counties in 1996. Endogeneity concerns are addressed by exploiting state-level variation in the maximum interest rate chargeable by pawnbrokers, an interesting approach arguably characterized by some data limitations. In practice, unobserved county or state characteristics—related to the number of pawnshops, crime, and a state's decision to set a particular interest rate—might be a confounding factor in the analysis.

My paper is then related to the literature examining the impact on theft crimes of security technology and investments, which affect the cost incurred by criminals when stealing or re-selling stolen goods. Ayres and Levitt's (1998) and Gonzalez-Navarro (2013) examine the Lojack car security system operating via a radio transmitter hidden inside cars, which facilitates the recovery in the case of theft, disrupting the activity of chop shop businesses trading stolen vehicles. Vollaard and Van Ours (2011) focus on the effect of regulations in the Netherlands that mandated the introduction of burglary-proof windows and doors; Vollaard and Van Ours (2016) also examine the effects of a regulation that made application of the electronic engine immobilizer mandatory for all new cars sold within the European Union. Cook and McDonald (2011) investigate the effects of private initiatives in Los Angeles—in which businesses cover a common area by contributing to private security expenditures. Another branch of the literature examines the effects of taggant forensic technologies (such as SmartWater) that are becoming an increasingly popular part of the national crime reduction strategies. Metals at risk of theft marked in this way can be identified as stolen and traced back to the original location (Gooch et al. 2016).

My findings indicate that the effects of changes in gold prices on burglaries are amplified by the presence of markets trading gold products. Therefore, my work contributes to the literature examining how the changing value of goods affects the propagation of property-related crimes. Reilly and Witt (2008) examine the relationship between domestic burglaries and the price of audiovisual goods using an annual time series of UK burglary and price data over the period 1976–2005, when the retail price of audiovisual goods fell by an average of 10% per year. Draca, Koutmeridis, and Machin (2015) detect crime-price elasticities estimated from a crime dataset containing information on stolen items for London between 2002 and 2012. They show that thefts are highly responsive to consumer and scrap metal prices suggesting that burglars switch to items that yield higher returns. Similarly, Kirchmaier et al. (2018) show sizeable and

significant metal crime-price elasticities, in line with the idea that changing economic returns shape crime. However, the crime dynamics are also explained by changes in policing and policy, suggesting that a tougher regulatory system can reduce the market size for potential metal criminals to sell what they have stolen. Finally, from a theoretical perspective, Galiani, Jaitman, and Weinschelbaum (2016) develop a model to study how the changes in the durability of the goods affects prices of stolen goods, the incentives to steal and the equilibrium crime rate. They show that lower durability of goods reduces the incentive to steal those goods, thus reducing crime.

This paper unfolds as follows. Section 2 provides a background on pawnshops and crime. Section 3 presents the data, lays out the initial econometric analysis, and then reports the findings, heterogeneity analysis, and various robustness checks. Section 4 introduces the role of gold in the quasi-natural experiment, outlines the research design, presents the results and the robustness checks. Section 5 concludes this paper.

2. Background on Pawnshops and Crime

Pawnshops offer cash in exchange for clients' personal property.[2] Pawnshops commonly trade jewelry, mobile phones, audio-video equipment, electrical items, and laptops (see table A1). The client can either directly sell the item to the pawnbroker or ask for a loan, using the pledge as collateral. In the latter case, the pawnbroker holds the personal item in custody until the loan's maturity date, typically two months after the initial transaction. If the client does not return to reclaim the item, then its ownership passes to the pawnbroker.[3] Even if pawnbrokers assume the risk that an item might have been stolen, they often only lose the collateral and the amount loaned if the police seize the item. In fact, the charge for criminal possession depends

[2] For a complete review of pawnshops' operating system see Shackman and Tenney (2006).
[3] Thieves likely want to obtain cash for their loot. For this reason, they will try to sell the item to a pawnshop, rather than just pawn it. Similarly, to avoid suspicion, they might decide to pawn an item knowing that this will not be later redeemed. Data on sales and unredeemed items are not available to the researcher.

upon the evidence that the pawnbroker was aware of the item's illegal origin, which is often difficult to prove.[4] Furthermore, pawnbrokers might intentionally or unintentionally facilitate the trade of stolen items because most goods do not have a unique identifier, and pawnbrokers, police, or the victims might not be able to recognize them.

In order to prevent the trade of stolen items, laws in many jurisdictions regulate pawnbrokers' activities.[5] Pawnbrokers must collect a copy of the client's photo identification and must hold purchased items in store for a fixed period of time, to allow law enforcement agencies to check suspicious items. Pawnbrokers may also be required to send the police a list of all the newly pawned items and, whenever possible, their associated serial numbers. Despite these measures, law enforcement officers, newspapers, and the general public point the finger at what various investigative reports describe as a "modern thief's automatic cash machine" (Glover and Larubbia 1996).[6] These authors use pawnshop-level transaction data to rank clients by the number of transactions made. Thirty-nine of the top fifty clients had criminal arrest records, often related to burglary, theft, or similar offenses. Fass and Francis (2004) used a similar approach to analyze a database of all pawn transactions recorded by the Dallas Police Department from 1991 to 1996. The researchers show that the 14,500 people pawning more than thirty times were more likely to have theft-related criminal convictions than occasional clients.[7]

Other pawnshop regulations may be of interest for the scope of this paper. In particular, some US states impose limits on the interest and fees that pawnbrokers can charge their clients. The

[4] Stephen J. Rodriguez, Los Angeles Criminal Defense Firm: http://www.lacriminaldefenseattorney.com/Legal-Dictionary/F/FA-FIRE/Fence.aspx

[5] To the best of my knowledge, no change in pawnshops' regulations took place during the period of analysis. See appendix B for more information and links to state regulations.

[6] Wright and Decker (1994) gain precious insights by interviewing burglars in the St. Louis area. First, even if pawnbrokers must have a record of the name of the client, the address, and the form of identification, jurisdictions rarely make full use of this information. Moreover, these requirements can be easily deceived because burglars may provide false information or use false identification when needed (Glover and Larrubia 1996).

[7] Organized Retail Crime Annual Report: https://www.rila.org/protection/resources/Documents/OrganizedRetailCrimeAnnualReport.pdf

presence and the extent of these limitations might affect the profitability of this business: By acting as a price ceiling, usury laws directly constrain the amount of revenue generated on each repaid loan (Miles 1997). On the one hand, these regulations could reduce the number of operating pawnshops, possibly decreasing associated criminal activity. On the other hand, pawnbrokers might be more incentivized to accept items of dubious origin if their capacity to generate lawful profits is hindered by the presence of strict regulations. I will thus examine possible heterogeneous effects on crime dependent on the maximum interest rate that pawnbrokers can charge to their clients.

2.1. Pawnshops and Crime: Potential Mechanisms

The main hypothesis of my work is that pawnshops affect crime by serving as a market for stolen goods. In particular, acquisitive crimes such as larcenies, burglaries, and robberies may be most affected by the presence of pawnshops because these crimes target items that are also frequently traded by pawnshops.[8] But, what are the possible channels through which the presence of pawnshops may influence these crimes? More pawnshops in an area could directly raise the returns of crime by allowing less costly and more rapid conversions of stolen goods to cash. A larger presence of pawnshops in an area may also increase burglars' chances of finding an unaware or a complicit pawnbroker and may deter law enforcement capacity to monitor suspicious activities. Also, competition among shop owners could increase the prices thieves can obtain for their wares and may reduce a pawnbroker's incentive to question items of uncertain origin. As one pawnbroker put it: "If he's coming in my store with a videocassette recorder, I'm not asking him where he got it. It's the police's job to find out if it's stolen, not

[8] Larceny is the unlawful taking, carrying, leading, or riding away of property from the possession of another. Burglary is the unlawful entry into a structure to commit a felony or theft. Robbery is taking or attempting to take anything of value from the care, custody, or control of a person by force or violence.

mine. You don't ask where things come from. If you don't take those, the guy down the street will" (Glover and Larubbia 1996, 22*)*.

However, other channels could also play a role in this context (Kubrin et al. 2011; Lee et al. 2014; Kubrin and Hipp 2016). First, social disorganization theory predicts that businesses such as pawnshops might reduce the social cohesion and informal control of the surrounding community, fostering a general environment that is more conducive to any sort of property and violent crime. A second, more ambiguous channel relates to the role of pawnshops as credit providers. On the one hand, because these businesses offer loans at high interest rates, clients experiencing financial difficulties may turn to crime as a way to pay off their debts. On the other hand, pawnshops might reduce the criminal propensity of potential thieves at the margin of crime by providing credit access to unbanked clients. Finally, pawnshops can function as crime attractors. Clients regularly visit pawnshops with large sums of cash in their pockets or with precious items such as jewels, drawing potential criminals to the area. Thus, communities with more pawnshops might experience higher rates of robbery. Given the multiple channels possibly connecting pawnshops and crime, in the results section, I will discuss how my findings map onto the broader conceptual framework presented here.

3. Data and Empirical Analysis

This section describes the newly assembled database. Then, it presents the empirical analysis and various robustness checks, and investigates possible heterogeneity in the results.

3.1 Data

Pawnshop data. Infogroup Academic provided county-level annual data on pawnshops. Infogroup implemented a data-gathering process that follows a six-step procedure. In the compilation phase, data are directly taken from sources such as government sources, public

company filings, utility information, tourism directories, web compilations, and Rich Site Summary (RSS) feeds. The second step in the process is address standardization, followed by a phone-verification phase, with 40 million calls made per year. The last four phases include standardization of the elements, duplicate removal, enhancement of content, and a final quality check. Infogroup gathered information on the number of pawnshops for a perfectly balanced panel of 2,213 US counties from 1997 to 2010. These data include 70% of US counties, covering around 91% of the US population. Infogroup under surveyed low populated counties, thus providing incomplete data coverage.[9] Two aspects are worth noting. First, the findings of my paper may not generalize to smaller counties and, in fact, I will show that the criminogenic effects of pawnshops are larger in highly populated counties, rather than in rural settings. Second, the validity of the Infogroup data is corroborated by the US Census Bureau's Economic Census. Taking into account the different data coverage, the aggregate numbers are rather similar across the two sources: Infogroup reported an annual average of around 7,526 pawnshops per year; the 2012 US Census reported 8,721 pawnshops nationwide (North American Industry Classification System [NAICS] 5222981).[10]

Crime data. I used the FBI's Uniform Crime Reports (UCR) data on offenses known and clearances by arrest. Federal, state, tribal, county, and local law enforcement agencies voluntarily submit detailed monthly crime data. The variables include the counts of different types of crime for each law enforcement agency as well as the population covered by the agency. The crimes reported are murder, rape, assault, robbery, burglary, larceny, and motor-vehicle theft. The agencies report their crime statistics to the FBI. The FBI then compiles and disseminates the data in the form of the UCR. The UCR data are the best publicly available

[9] The average population in counties belonging to the estimating sample is 124,950 against an average population of 17,711 in counties outside the sample. Counties with zero pawnshops for the entire sample period are part of the data provided by Infogroup (51 out of 2,213 counties).

[10] County business pattern data cannot be used to retrieve the number of pawnshops at the county-year level because pawnshops are classified within a larger group of non-depository credit intermediation establishments (NAICS 522298), which also includes payday lenders and other similar types of businesses.

data on crime in the US; however, there are known issues about the underlying quality of the reported information. In particular, an annual average of around 35% of the enforcement agencies do not report crime or only report crimes for a subset of months within a year. The UCR annual data include indicators for whether or not the agency reported all months within a year and, in case, the last month when the agency stopped reporting crime. This allows to eliminate from the estimating sample agencies that did not report crime at all or agencies that stop reporting crime before December, reducing the likelihood of employing misreported annual crime data in my analysis.[11,12]

Socioeconomic controls. The analysis focuses of the effects of pawnshops—which often provide credit to people experiencing financial adversities—on acquisitive crimes, which are likely to be connected to changes in local socioeconomic factors. This raises the concern that the relation of interest could be driven by changes in socioeconomic conditions that cause changes in both pawnshops and acquisitive crimes. To mitigate the extent of this concern, I show that results are robust to the inclusion of a wide set county specific annual controls. In particular, I include income-related measures (income per capita, number of people below the poverty line, percentages of poverty and unemployment) and credit-access measures (commercial banks and saving institutions per 100,000 people, amounts in US dollars of banking and saving deposits). I also include population density, the county's racial/ethnic composition, and the male population aged between 15 and 24, as crime rates are observed to be particularly high within this age-range for this population (Landersø et al. 2017).[13]

[11] Crime statistics cannot inform about unreported crimes. This may influence my estimates if the victims' propensity to report acquisitive crimes within an agency is correlated with local changes in pawnshops, or if global changes in gold prices differentially affect crime reporting in counties with larger initial rates of pawnshops.
[12] In two robustness checks (table A5 column 7 and table A6 column 8) I show similar results, both in terms of magnitude and precision, when using data aggregated by the UCR at the county level. These data are not used in the main analysis because of various issues related to crime imputation due to agency underreporting (Malz and Targonski, 2003).
[13] I used the US Census Bureau and the Bureau of Labor Statistics Current Population Survey.

Final Merging and Sample Selection. I merged county-level annual crime data (aggregated from the agency-level crime data) with county-level annual pawnshops data. The database, which includes 19,049 observations, is formed by an unbalanced panel of 1,899 counties, to which I have then added all the county-level annual socioeconomic covariates.[14] Two aspects are worth noting. First, the paper's findings will be shown to be very similar, in terms of both magnitude and precision, when the analysis is conducted on a perfectly balanced panel of counties including agencies that report crime during each year of the sample. Second, the estimating sample is restricted to eleven years, from 1997 to 2007. I exclude the three years up to 2010, when pawnshops data were still provided by Infogroup, to avoid possible confounding effects due to the 2008 financial crisis, which significantly affected global prices, local economies, poverty and crime, possibly leading other stores such as jewelries, cash for gold and online businesses into the trade of gold products.[15]

3.2 Empirical Analysis

I use the following baseline equation:

$$Crime_{rate_{c,t}} = Pawn_{rate_{c,t}}\beta_1 + \alpha_c + \mu_t + \epsilon_{c,t} \qquad (1)$$

where the subscript *c* indicates the county, and *t* the year. My baseline specification includes crime and pawnshops rates. These variables measure the availability for each individual in a county of possible markets for stolen goods and their effects on local criminal activity. The analysis focuses on β_1, the effect of pawnshops on crime. Under the assumption that greater access to alternative markets for stolen goods does not "solve" the variation in access to

[14] In less than 3.4% of the cases police agencies span multiple counties. I proceed as follows. I include the enforcement agency in the county containing the majority of its population. I then show that excluding from the estimating sample counties that contain these agencies has no impact on the results (table A5 column 9 and table A6 column 10).

[15] The estimates obtained including this last period are similar to the baseline (see table A5 column 8 and table A6 column 9).

pawnshops, changes in their presence affect the thickness of the local market for stolen goods and, consequently, the value of criminal opportunities and the proliferation of theft crimes.[16] The model also incorporates county fixed effects α_c, which absorb unobserved time-invariant heterogeneity across counties; and year fixed effects μ_t, which absorb common shocks across the United States. I employ a weighted least squares (WLS) estimator, using as weight the population covered by the FBI agencies reporting crime in a county-year. The WLS estimator consistently estimates the population linear projection of the dependent variable on the explanatory variable. Also, in my data the population varies widely across counties and the group average error term is heteroskedastic. Hence, the ordinary least squares (OLS) estimation is inefficient and leads to inconsistent standard errors. Instead, the WLS estimator is the minimum variance linear unbiased estimator that produces consistent standard errors correcting for heteroskedasticity (Deaton 1997; Solon et al. 2015). I use standard errors robust to heteroskedasticity clustered at the county level.

3.3 Results

The results are presented in table I. Panel A shows the estimates of β_1 using the pooled measure of theft crimes as the outcome, which contains larceny, burglary, and robbery. This is the main outcome of the analysis, as it includes acquisitive crimes targeting items that, in principle, might be tradeable to a pawnshop. Panel B shows the estimates on motor-vehicle thefts. Panel C reports the estimates on the pooled measure of violent crimes, including assault, rape, and murder. Results shown on panel B and C thus represent a first falsification test for the analysis.

[Table I Here]

[16] Information about the size of each pawnshops, which may be different for new entrants in the market, is not available. My analysis assumes that pawnshops are of similar size.

I first focus on theft crimes (panel A). Column 1 presents the initial specification that only includes year fixed effects: The point estimate for the coefficient is 100.7 and is significant at the 1% level. I then include county fixed effects (column 2). The latter inclusion reduces the estimate to 13.83 ($p < .05$) indicating that pawnshops are typically located in areas with more criminal activity. The analysis suggests that a one-unit increase in the number of pawnshops in a county increases by around 13 the number of acquisitive crimes in the same county.[17] Panel B shows no effects on motor-vehicle thefts across the various specifications.[18] Panel C reveals that the effects of pawnshops on violent crimes disappear when county fixed effects are included in the estimating equation.[19]

Leads and Lags. More pawnshops can open up in counties where crime is on the rise, thus inflating the estimate of β_1. I explore this possibility in table II. Column 1 reports the results of equation (1) for comparability purposes. Column 2 shows the results when I include the one-year lead and lag of pawnshops. The point estimate for the measure of pawnshops at $t - 1$ is 10.21 with $p < .05$. The estimate for pawnshops in period t is still large (6.5) but not significantly different from zero. Notably, the estimate for the future measure of pawnshops at time $t + 1$ is negative, smaller (–1.02) and not significant. Column 3 reports a similar exercise including two-years leads and lags of pawnshops. Findings are qualitatively similar to the previous exercise. The estimates for past and current measures of pawnshops are relatively large: 6.1, 4.1, and 7.3 for t – 2, t – 1 and *t,* respectively. Point estimates obtained at $t + 1$ and

[17] Results are robust to the inclusion of a wide set of county-level socio-economic covariates (see table A4). Socio-economic covariates are not included in the baseline estimating equation because these can be endogenous to changes in pawnshops.

[18] The minimum detectable effect size, that is the effect size below which I may not be able to distinguish the effect from zero even if it exists, is about 0.7% change in motor vehicle theft. This suggests that the lack of effects detected is genuine, rather than the product of low-powered estimates.

[19] In appendix D, I show that the Harris-Tzavalis unit-root test for pawnshops rejects the presence of non-stationarity in the data. I also show a time series autoregressive model and an estimating equation in first differences that generates similar results to the regression in levels.

$t + 2$ are smaller (-0.6 and 2.2, respectively).[20] Overall, the absence of large effects of future measure of pawnshops on current crime rates mitigates the concerns that the estimates of β_1 may be inflated by the opening of pawnshops in areas where acquisitive crimes are rising.

State-by-Year Fixed Effects and Balancing Test. Column 4 adds state-by-year fixed effects to the baseline. These absorb unobserved state-specific variations over time, such as policies that could affect changes in both the number of pawnshops and in criminal activity. The estimate is barely affected (11.36) and it is significant at the 5% level. Table A3 further investigates the validity of the key identifying assumption of equation (1). Specifically, a balancing test is used to examine the possible impacts on pawnshops of income and credit-related measures that may also independently affect the proliferation of acquisitive crimes. This balancing test also controls for county, year fixed effects as well as a vector of population controls. The estimates for the socioeconomic factors are all very small and not significantly different from zero. Also, the value of the *F*-statistic (0.47) indicates that the null hypothesis of joint insignificance of these estimates cannot be rejected under the conventional significance levels.[21] Overall, this balancing test appears to lend further credibility to the key identifying assumption of the empirical design, attenuating the concern that residual within-county variation in the rate of pawnshops may be correlated with significant changes in determinants of local crime that are potentially unobservable to researchers.

[Table II Here]

Balancing the Panel, Unweighted Regressions, Effects Size. Columns 5 of Table II shows the results obtained from a sample of 890 counties observed for all 11 years of the sample. Despite losing almost 50% of the observations, the estimate (15.73) is larger than the baseline

[20] These exercises are conducted on smaller samples given that the analysis automatically drops county-year observations for which no data exists on the leads and/or lags of pawnshops. This likely hinders the power of the analysis and the precision of these estimates.
[21] Table A3 was developed by closely following the work of Pei et al. (2018).

and it is significant at the 10% level. This indicates that the results are not driven by changes in the composition of counties in the sample. Column 6 shows instead the results of equation (1) unweighted. The estimated coefficient is around two third of the size of the weighted specification (8.65) and it is precisely estimated ($p < .05$). The reduction in the magnitude of the estimate hints toward possible heterogeneous effects of pawnshops on crime associated with differences in population. In fact, in the presence of heterogeneous effects, weighted least squares estimates—placing higher weight on the most populated counties—may indicate different averages of the effects than the OLS unweighted estimates (Solon et al. 2015). These heterogeneous effects will thus be examined in the next table. Colum 7 shows the point estimate obtained using a log-log regression. Variables are transformed in logarithmic form using *log* $(1 + z)$, where z is the rate of the variable expressed per 100,000 persons. The estimated elasticity is 0.029, significant at the 5% level. This result suggests that a 10% increase in the rate of pawnshops increases by around 0.3% acquisitive crimes yielding loot that might be tradeable to pawnshops. Information on pawnshops' size is not available to the researcher, therefore the estimated elasticity implicitly assumes that pawnshops are of similar size.[22] To provide a benchmark for this estimated coefficient, the crime elasticity of police manpower, sentence length, and incapacitation of criminals vary within a range of 0.1 to 0.8 (Chalfin and McCrary 2017).[23] The size of the effects is moderate, possibly because pawnshops represent one of the possible markets where stolen items can be traded, or because changes in the

[22] This elasticity is in line with the size of the effects obtained using the linear specification, considering the mean of the dependent and independent variable of interest (3,367.9 and 5.8, respectively) and the point estimate for the coefficient.

[23] An annual average of 2 million burglaries and 7 million larcenies were recorded by law enforcement agencies during the period of analysis. Assuming an underreporting of crime of 60% (NCJ, 2016), an estimated stolen value per crime of around $2,300 for burglary and of $1,000 for larceny (FBI, 2017), assuming that 50% of the value of the stolen goods could be traded to pawnshops (table A2), a 0.3% elasticity suggests that the total annual value of the loot going through pawnshops was around $30 million, or $3,500 per pawnshops.

transaction costs of crime may have a smaller impact than changes in punishment, sanctions, and legal markets opportunities.[24]

3.4 Channels and Heterogeneity Analysis

Columns 1 to 3 in Table III show point estimates for the coefficient of interest, split by type of theft crime. The estimates are: 12.49 for larceny, 1.51 for burglary, and -0.17 for robbery. The estimate for larceny is significant at the 1% level, while coefficients for burglary and robbery are not precisely estimated.

[Table III Here]

Channels. How do the results map into the discussion of the possible channels connecting pawnshops and crime presented in Section 2.1? First, the analysis shows positive and significant effects concentrated on theft crimes whose loot may be sold to pawnshops and no effects on motor-vehicle thefts and violent crimes. These findings appear to be consistent with the market for stolen goods hypothesis, suggesting that pawnshops are likely to affect criminal activity because of their involvement in the trade of stolen property. Second, effects on acquisitive crimes may be partly inflated by social disorganization. However, this channel seems unlikely to drive the findings. If that were the case, we should have probably expected to find a more homogenous impact of pawnshops across property and violent crimes. Third, as previously discussed, pawnshops might incentivize criminal behavior by providing credit to clients experiencing financial adversities. The robustness of β_1 to the inclusion of various covariates controlling for changes in local socioeconomic conditions, potentially affected by

[24] Other robustness checks for estimating equation (1) are shown in appendix table A5. This includes the trimming of the counties in the first and second percentile of the population and of the pawnshop distribution, as well as the inclusion of pawnshop rates with population fixed to the first year of the sample (to avoid variation due to changes in population rather than changes in pawnshops), the use of county-level imputed data, the inclusion in the sample of years 2008 to 2010, and the exclusion of counties containing agencies spanning multiple counties. Estimates are robust across specifications.

the credit operations of these businesses, seems to suggest that this channel alone is unlikely to drive the results. However, it cannot be completely ruled out that my estimates may capture an increase in acquisitive crimes partly driven by the high-interest loans offered by pawnshops. Finally, the lack of significant effects on robbery suggests that my results are not driven by the crime attractor hypothesis, which conjectures that pawnshops might affect crime drawing to the area robbers targeting clients carrying cash and valuable items.[25]

Geographical Spillovers. The preceding analysis has focused on the effects that pawnshops located in a county have on crime in the same county. However, crime in a county might be influenced by the opening of pawnshops outside its territory. Table III, column 4 explores this possibility by including the rate of pawnshops in counties sharing borders with the county where crime is measured.[26] The point estimate related to effect of pawnshops in the same county is 13.82, and it is significant at the 5% level. The estimated coefficient for pawnshops located in bordering counties is smaller (6.38) but with large standard errors associated to it, and hence difficult to interpret. Column 5 shows a similar exercise, including in equation (1) the state-level rate of pawnshops, which excludes pawnshops and population in the county where crime is measured to avoid geographical overlapping with the county measure of pawnshops. The main estimate is similar to the baseline (12.66 with $p<.05$). The estimate associated to the state level measure of pawnshops is around 50% larger than the baseline (18.09) but not precisely estimated. I thus conclude that more research is warranted to examine possible geographical spillover effects of markets for stolen goods on crime.[27]

[25] Changes in the availability of businesses such as pawnshops may foster, or may be correlated to, the local spreading of addictive drugs. This, in turn, can lead to more thefts. My analysis is robust to including county-year annual level measures of death from drug poisoning, a proxy for changes in drug use. This analysis is reported and discussed in appendix C.

[26] One county is dropped from this analysis because none of its bordering counties are included in the estimating sample.

[27] Sutton et al. (2001) and Sutton (2010) described how thieves might prefer to steal and sell the loot locally, but prolific offenders such as drug addicts (well known by local authorities and business owners) might need to travel farther away from their community to do shoplifting and to sell the loot. According to Sutton (2010): "*Thieves generally prefer to sell stolen goods locally…Therefore, a concentration of local thefts might (but not necessarily)*

Population Size. Columns 6 and 7 show point estimates obtained splitting the sample in counties below and above the median of the initial population. The effects are largely concentrated above the median: The point estimate for the coefficient is 23.95, around 70% larger than the baseline estimate, and it is significant at the 10% level. I conjecture that, for instance, highly populated areas might be more difficult for victims of crime and local enforcement agencies to monitor, and social control of businesses operating at the margin of legality could be lower than in rural contexts, potentially inflating the effects that these shops have on the proliferation of acquisitive crimes. Also, a market-size effect may be in operation in this context, because in highly populated areas a larger supply of stolen goods may increase its overall demand.

Nonlinearity. I now investigate possible nonlinear effects of pawnshops on crime. I use a non-parametric specification, where I include dummies for the second and third tercile of the pawnshops' distribution (2.5 and 9.9 pawnshops per 100,000 people, respectively). Column 8 of table III shows the results. Effects on the third tercile are positive, significant at the 5% level, and three times larger than in the second tercile. Arguably, these larger effects in areas with a higher concentration of pawnshops could be driven by business competition leading pawnbrokers to increase the resale prices of (stolen) items, hence making crime more profitable; also, the presence of several pawnshops in a small area might reduce the time needed by criminals to complete illegal transactions reducing the costs associated with the sale of the stolen items.

Pawnshops, Usury Laws, and Theft Crimes. Table IV investigates the presence of differential effects on crime considering the value of the maximum interest rate that pawnbrokers can charge to their clients, which is dictated by state regulations in 33 states.[28] Column 1 shows the

indicate the relatively close proximity of a local market for those goods." However, *"other possibly more important markets farther afield"* should not be neglected in the analysis of what motivates local crime.

[28] Appendix B reports the details of the data-gathering process and the links to the state-level regulations. Table B1 shows the maximum interest rate (that remained constant during the period of analysis) allowed in each state.

baseline results for the sample of states where the interest rate is regulated (21.81 with $p<0.05$). In columns 2 and 3, I divide the sample using the median of the maximum interest rate chargeable by pawnbrokers. Below the median, the average maximum interest rate is 12% and 4.4 pawnshops per 100,000 people operate, on average. Above the median, the interest rate is 23.6%, and more pawnshops operate (7.1 per 100,000 people). The effects of pawnshops on acquisitive crimes are concentrated in states where the maximum interest rate is above the median. The estimated coefficient is 44.4 and it is significant at the 1% level. Below the median, I detect an estimate of 1.01 not significantly different from zero. Overall, these findings seem to suggest that higher interest rates may increase the profitability of this business, increasing the number of operating pawnshops, and the criminal activity associated with their presence.

[Table IV Here]

4. Responses to Changes in Gold Prices

4.1 Gold, Pawnshops, and Burglaries

Gold products have always been the primary determinant of pawnbrokers' profits, representing roughly 80% of the value of all pledges (Bos et al. 2012). Carter and Skiba (2012) show that 50% of pawnshop loans are collateralized with jewelry, with over half of jewelry consisting of rings.[29] What makes gold so important for pawnbrokers? The majority of pawnbrokers' profits originates from melting down gold received by their clients through a refinement process. A refiner takes the rings, necklaces, bracelets, and other items and melts them until something close to pure gold is obtained. Therefore, stolen items—possibly

[29] See table A1. The sample of observations originated from a pawnshop lender in Texas between 1997 and 2002 but can be interpreted as representative of the transaction profile of a typical pawnshop. See also Fellowees and Mabanta (2008).

transformed into an unrecognizable bar of precious metal—can disappear from the pawnshop's counter, ending up in the bullion market or similar places.[30]

Which acquisitive crimes target gold products? Gold items are most commonly stolen during burglaries (Table A2).[31] Arguably, fewer gold items might be targeted in a typical larceny because this crime does not involve trespassing on private property, where precious goods are generally secured and protected.[32] Finally, robberies target jewels and precious items, but also cash. Notably, almost 60% of robberies are accomplished in commercial houses, gas stations, banks, and convenience stores (FBI 2010), suggesting that criminals are more prone to use violence—facing in expectation harsher judicial sentences—to get an immediate monetary reward rather than to steal items that would be later converted in cash. In the subsequent analysis I will thus show results for the pooled measure of property crimes and separately for burglary, larceny, and robbery.

4.2 Empirical Analysis and Results

Empirical Analysis. Draca, Koutmeridis, and Machin (2015) show that changes in gold prices affect jewelry crimes, indicating that burglars respond to changes in the value of criminal opportunities by targeting items that are more valuable. In what follows, I posit that the increase in gold prices will cause more burglaries in areas with more pawnshops. Business competition may incentivize pawnbrokers to pay more for gold products, increasing the number of crimes targeting gold items.[33] Also, the presence of more pawnshops in a county will likely reduce the costs that thieves face when reselling stolen property, providing extra incentives to commit

[30] The bullion market is a forum through which buyers and sellers trade pure gold and silver.
[31] Police-recorded crime data are from the Sanwdwell Metropolitan Borough Council area of the West Midlands (Burrel and Wellsmith 2010).
[32] UCR data do not classify the type of objects stolen by crime category. In 2010, only 11.3% of common larcenies targeted normal buildings, while 35% were thefts from motor vehicles, 17% from shops, 3% bicycles, and 31.8% all others.
[33] County-level data on gold prices paid by pawnbrokers are not available to the researcher.

burglaries when gold prices display a significant increase. I extend estimating equation (1) as follows:

$$Crime_{rate_{c,t}} = (Pawn_{Rate_{c,t=0}} \times gold_t)\beta_2 + Pawn_{rate_{c,t}}\beta_3 + \alpha_c + \mu_t + \epsilon_{c,t} \quad (2)$$

This empirical exercise combines cross-sectional variation arising from differences across counties in the initial rate of pawnshops, with time-series variation associated with changes in global gold prices. The coefficient of interest is β_2, the effect of gold prices interacted with the initial rate of pawnshops in a county. Importantly, the rate of pawnshops at time *0* only varies cross-sectionally, further addressing possible reverse causality due to the sorting of pawnshops in areas with increasing numbers of thefts. I include county and year fixed effects, which absorb unobserved time-invariant heterogeneity across counties and common shocks across the United States. The inclusion of these fixed effects partials out from the estimate the direct effect that the initial rate of pawnshops and the change in gold prices have on crime. Consistently with equation (1), I also include the main effect of pawnshops at time *t.* This allows to differentiate the main effects of pawnshops (β_3) from additional criminogenic effects associated with changes in gold prices (β_2). Regressions are weighted by population in a county, standard errors are clustered at the county level.

[Table V Here]

Results. Table V reports the results for the interaction effect β_2 and for the main effect of pawnshops β_3. Column 1 shows the result for the pooled measure of theft crime. The main effect of pawnshops is positive and significant (14.3 with $p<.05$). The point estimate for the interaction term is relatively small (0.34), and it is not precise under the conventional significance levels. We then analyze the results by type of theft crime. For burglary, the main effect of pawnshops is 3.07 with $p<.05$. The estimated interaction-term coefficient is 1.13, and

it is significant at the 1% level. For larceny, the main effect of pawnshops is positive and significant (11.33) with $p<.05$, while the estimates for the interaction term is –0.84 (almost the opposite of the one detected for burglary) and not precise under the conventional significance levels. For robbery, the main estimate is –0.1 and the estimate for the interaction term is 0.05; both are not significantly different from zero.

These findings suggest that gold prices increase by around 30% the criminogenic effects that pawnshops have on burglaries and provide indirect evidence about the hypothesized causal mechanism. Also, these results appear to be in line with the premise that a large majority of gold products are stolen during burglaries, rather than larcenies or robberies. Table VI further investigates the robustness of these estimates.

[Table VI Here]

Sensitivity Analysis. Column 1 displays the most parsimonious specification, only including county and year fixed effects. The estimate for the interaction term is 0.96 with $p<.05$. Column 2 adds pawnshops at time *t,* as in table V column 2, for comparability purposes. One might be worried that the initial rate of pawnshops could be correlated with determinants of acquisitive crimes, such as poverty and labor market conditions. Therefore, in column 3, I test the sensitivity of the estimate of interest by including the wide set of county-level annual socio-economic covariates. The estimate (1.091) is similar to the baseline and it is significant at the 1% level. Another concern is that in locations with a higher initial rate of pawnshops there may be fewer legal job prospects, and the opportunity cost of committing crime may be relatively low. These local characteristics, rather than the presence of pawnshops *per se*, could incentivize the emergence of burglaries when the growth in gold prices makes crime more profitable. Similarly, the initial rate of pawnshops might be correlated with the level of expertise of burglars operating in the area. Therefore, larger effects on crime could be driven by the

responses of prolific and specialized criminals, who might be more reactive to changes in the value of criminal opportunities, caused by the increase in gold prices. To explore the extent of these concerns, I saturate the model including the entire set of baseline county economic and demographic variables interacted with gold prices. I also add the interaction of gold prices with the initial rate of burglaries and with the initial share of burglaries on all crimes committed. Results are shown in column 4. If anything, this inclusion further inflates the size and the precision of the estimate (1.63 significant at the 1% level). This exercise supports the hypothesis that the effects are closely related to the presence of pawnshops in an area, rather than to unobserved correlated factors. Column 5 includes state-by-year fixed effects. This inclusion deflates the size of the estimate (0.89) significant at the 10% level. State-by-year fixed effects confine the identifying variation to counties within the same state. The reduction in the size of the effects suggests the presence of geographical spillovers, amplified by the increase in gold prices, between close counties with different initial rates of pawnshops. Finally, it may be worth noting that the estimates of the main effect β_3 are similar across columns and significant under the conventional significance levels.

Event Study Analysis. The key identifying assumption of estimating equation (2) is that counties with a different initial rate of pawnshops would have experienced similar crime trends, absent a change in gold prices. In 1997, the gold price per troy ounce averaged over the year was around $330 and it remained rather stable until 2001. In the following years, gold prices experienced an abrupt increase, arriving at around $445 in 2005, and $695 in 2007. Arguably, one should expect to observe higher criminogenic effects in counties with a larger initial rate of pawnshops emerging in final years of the sample, when gold prices experienced a large and permanent increase, rather than in initial years, when gold prices exhibited less variation. I explore these hypotheses by implementing the following event-study design:

$$Burglary_{rate_{c,t}} = \left[Pawn_{Rate_{c,t=0}} \times \sum_{t=1997}^{2007} (\lambda = t) \right] \theta_t + Pawn_{rate_{c,t}} \beta_4 + \alpha_c + \mu_t + \epsilon_{c,t} \quad (3)$$

I interact the initial share of pawnshops in a county with λ, an indicator variable for each year in the sample. The annual effects of the initial rate of pawnshops on burglary are identified by θ_t. I exclude the interaction in year 2001, the last year when gold prices were relatively stable, which represents the reference point for this analysis. As in estimating equations (1) and (2), I also include the contemporaneous measure of pawnshops, county and year fixed effects. Regressions are weighted by population in a county, standard errors are clustered at the county level. Figure 1 plots the estimates and confidence intervals for θ_t.

[Figure 1 Here]

For the years prior 2001, the estimates are all small, negative, and not significantly different from zero. Year 2000 represents the only exception given that $p<.05$. Estimates become positive in year 2002 and are large and positives for all the subsequent years. The associated *p-values* are below the conventional significance levels in years 2004 ($p<.01$), 2003 and 2007 ($p<.05$), and 2005 ($p<.1$). The coefficients for 2002 and 2006 are not precisely estimated. Figure A3 shows the results of a similar event study analysis that adds socio-economic covariates, trends and state-by-year fixed effects to equation (3), as in the most conservative specification presented in table VI column 5.[34] Estimates are qualitatively similar to the baseline and show larger criminogenic effects arising in the last four years of the sample, when

[34] Additional robustness checks for estimating equation (2) are reported in appendix table A6. This includes the trimming of the counties in the first and second percentile of the population and the pawnshop distribution, the exclusion of the first year in the sample for each county to avoid possible reverse causation of pawnshops and crime, results for a perfectly balanced panel, the use of county-level imputed data, the inclusion in the sample of years 2008 to 2010, the exclusion of counties including agencies spanning multiple counties, and results transforming burglary in logarithmic form using $log(1 + z)$, where z is the rate of the variable expressed per 100,000 persons. Results are similar across specifications.

gold prices were at their peak. Overall, this analysis—detecting criminogenic effects that emerge "on impact" when gold prices experienced a permanent increase—provides further support for the validity of the research design and the credibility of the results.

Gold Availability. Given that gold items are more likely held by certain demographic groups, one may expect to observe the impact of gold prices through pawnshops to be stronger in areas where these demographics are more prevalent. In particular, South Asians and American Indians have strong preferences for gold jewels, that for cultural reasons are used to store wealth and to signal social status (Lawrence, 2003; Braakmann et al. 2017). I thus investigate possible differential effects on crime dividing the sample using the median of the South Asian and American Indian population shares. I show results obtained using equation (2) in table A7. The estimates indicate that the presence of pawnshops amplifies the effects that gold prices have on burglaries in counties where the share of South Asians and American Indians is above the median. This result provides further corroboration for the hypothesis of my work, suggesting that changes in the value of criminal opportunities are larger in areas where gold items are more likely to be stored.[35]

5. Concluding Remarks

Theft crimes impose a substantial burden on society. Criminals often target items that can be later converted into cash. In this paper, I offer one of the first empirical investigations of the effects that markets for stolen goods have on crime. Two main challenges exist for this analysis:

[35] In areas with more pawnshops, acquisitive crimes could be incentivized by changes in the state of the economy, partly correlated with gold prices. I test the sensitivity of the estimate of interest to the inclusion of pawnshops at time 0 interacted with GDP and unemployment in the US. Estimates are robust to the inclusion of these interaction terms (table A6 column 12). Gold prices almost perfectly covary with prices of copper and other commodities that are also targeted by criminals. Therefore, I cannot conduct a credible exercise including pawnshops at time *0* interacted with other commodities' prices.

First, markets for stolen goods are hard to observe and to measure; second, the proliferation of these markets is plausibly endogenous to changes in local criminal activity.

I focus on pawnshops, a legal business that has long being suspected of being involved in the illicit trade of stolen items. The endogeneity of pawnshops to crime is addressed in multiple ways. I first exploit the panel properties of the dataset newly assembled for the analysis. A placebo exercise and a balancing test provide support for the identifying assumption behind the empirical design. The analysis shows significant effects concentrated on acquisitive crimes targeting items that might be traded to pawnshops, with no effect on motor-vehicle thefts or violent crimes. I then exploit an arguably exogenous shift in crime's expected returns, using the rise in gold prices as a quasi-natural experiment. The intensity of the treatment is determined by the initial rate of pawnshops in a county. The graphical and empirical analysis, together with various robustness tests, support the hypothesis that burglars respond more to changes in the value of criminal opportunities in areas with a larger market for the trade of stolen property.

My estimates, alongside the estimates of the cost of acquisitive crimes reported by Heaton (2010), suggest that the increase in theft crimes connected with the opening of ten pawnshops in a county could generate an economic loss of around $400,000 in the same county.[36] Thus, my analysis advocates for a closer monitoring of pawnshops by local authorities, particularly in urban contexts, and suggests that policies limiting the number of business licenses may be taken into consideration to attenuate possible impacts of pawnshops on theft crimes. However, it must be acknowledged that my paper does not examine the welfare effects associated with the role of pawnshops in providing cash to credit-constrained households. Restricting business competition among pawnshops may, for instance, increase the interest rate charged to the

[36] The estimated cost per crime expressed in 2007 US dollars is $2,137 for larceny and $13,096 for burglary (Table I; Heaton 2010).

clients, potentially worsening their financial situation. An evaluation of the welfare implications of pawnshops is beyond the scope of this paper and it is hence left for future research.

My study provides novel evidence on the effects that markets for stolen goods have on criminal behavior. The effects detected, while precisely estimated, are of moderate size. This may suggest that pawnshops could be just one of the possible markets where stolen items can be traded, or—more broadly—that changes in the transaction costs of crime may have a lower impact on illicit activities than changes in punishment, sanctions, and legal markets opportunities. For these reasons, my work highlights the scope to further investigate and quantify the effects that other physical and online markets such as junkyards, flea markets, eBay, Craigslist, and the dark web could have on the proliferation of crime. These markets may affect the value of criminal opportunities by reducing theft-related transaction costs, increasing the expected benefits arising from theft, amplifying the effects of world price fluctuations for metals and technological goods, and—in some cases—trading weapons, drugs, and other illegal products. Very little is known in this area, providing fertile ground for future research.

Acknowledgments

I thank the Editor Dennis W. Carlton and two anonymous referees for all the comments provided. These have undoubtedly improved the quality of the paper. I thank for the support throughout the PhD program Robert Akerlof, Dan Bernhardt, Mirko Draca, Rocco Macchiavello, and Chris Woodruff. I am indebted for the insightful discussions and useful comments to Clement de Chaisemartin, Richard Dickens, Richard Disney, Joseph Doyle, Giovanni Mastrobuoni, Imran Rasul, Fabian Waldinger, and all the participants of the CWIP (Warwick), ISC, PEUK, NESG, IAAE, SAEs, and the Third IZA Young Scholar Program at Georgetown, Washington, DC. I gratefully acknowledge the financial support from the Economic and Social Research Council (ESRC), the International Association of Applied Econometrics (IAAE), and the Royal Economic Society (RES). Any remaining errors and omissions are my own responsibility.

This research did not receive any specific grants from funding agencies in the public, commercial, or not-for-profit sectors.

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Table I
Pawnshops and Crime

	(1) Baseline	(2) + County FE
Panel A: Theft Crimes (Pooled)		
Pawnshops	100.7***	13.83**
	(13.26)	(6.281)
Outcome mean = 3,367.9		
Panel B: Motor-Vehicle Thefts		
Pawnshops	-4.992	0.264
	(3.579)	(1.366)
Outcome mean = 455.9		
Panel C: Violent Crimes (Pooled)		
Pawnshops	52.47***	-2.530
	(7.408)	(2.980)
Outcome Mean = 1,357.8		
Observations	19,049	19,049
Counties	1,899	1,899
Year FE	YES	YES
County FE	NO	YES

Note: Each panel reports the results of the effects of pawnshops on a separate crime. Theft crime (pooled) includes larceny, burglary, and robbery. These are crimes whose loot might be sellable to a pawnshop. Violent crime (pooled) includes murder, rape, and assault. Column 1 includes year fixed effects (FE in the table). Column 2 adds county fixed effects. Pawnshops and crimes are per 100,000 persons. Standard errors are clustered at the county level and are displayed in parenthesis. Regressions are weighted by population. *** significance at the 1% level, ** significance at the 5% level, and * significance at the 10% level.

Table II
Robustness Checks

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Outcome: Theft Crime (Pooled)						
	Baseline	Lead and Lag (1 Year)	Leads and Lags (2 Years)	State-By-Year FE	Balanced Panel	Unweighted	Log-Log
Pawnshops *(t-2)*			6.129				
			(5.032)				
Pawnshops *(t-1)*		10.21**	4.130				
		(5.044)	(4.292)				
Pawnshops *(t)*	13.83**	6.503	7.228	11.36**	15.73*	8.654**	0.0293**
	(6.281)	(4.085)	(5.198)	(4.791)	(8.925)	(4.123)	(0.0127)
Pawnshops *(t+1)*		-1.020	-0.626				
		(4.584)	(4.249)				
Pawnshops *(t+2)*			2.242				
			(5.238)				
Observations	19,049	15,236	11,478	19,049	9,790	19,049	19,049
Counties	1,899	1,875	1,778	1,899	890	1,899	1,899

This table shows the baseline estimating equation in column (1). Columns (2) includes pawnshops one-year lead and lag. Column (3) includes pawnshops two-years leads and lags. Column 4 includes state-by-year fixed effects. Column 5 shows results using a balanced panel (890 counties ×11 years=9,790 observations). Column 6 shows the results of equation (1) unweighted. Column 7 shows a log-log regression. I use *log(1+x)* where x is the rate per 100,000 people of the variables of interest. All of the specifications include county and year fixed effects (in column 4 the latter are absorbed by state-by-year fixed effects). Regressions are weighted by population (not in column 6). Crime and pawnshops are per 100,000 persons. Standard errors are clustered at the county level. *** significance at the 1% level, ** significance at the 5% level, and * significance at the 10% level.

Table III
Heterogeneity

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Larceny	Burglary	Robbery	Theft Crime (Pooled)				
				Bordering Counties	State	Below Population Median	Above Population Median	Non-Parametric
Pawnshops	12.49***	1.510	-0.177	13.82**	12.66**	6.054*	23.95*	
	(4.833)	(1.509)	(0.516)	(6.284)	(5.646)	(3.255)	(13.39)	
Pawnshops in Bordering Counties				6.384				
				(8.678)				
Pawnshops in a State					18.09			
					(27.22)			
Second Tercile								0.000527
								(0.000323)
Third Tercile								0.00134**
								(0.000661)
Observations	19,049	19,049	19,049	19,038	19,049	9,532	9,517	19,049
Counties	1,899	1,899	1,899	1,898	1,899	998	901	1,899

Note: Columns 1 to 3 show the results by type of crime included in the pooled measure of theft (larceny, burglary, and robbery). Column 4 adds pawnshops in counties sharing borders with the county where crime is measured. One county is dropped because none of its bordering counties are included in the estimating sample. Column 5 adds the state-level measure of pawnshops (this measure excludes pawnshops and population in the county where crime is measured). Columns 6 and 7 divide the sample in below and above the median of the initial county population. Column 8 includes dummies for the second and third terciles of the pawnshops' distribution. All of the specifications include county and year fixed effects. Regressions are weighted by population. Crime and pawnshops are per 100,000 persons. Standard errors are clustered at the county level. *** significance at the 1% level, ** significance at the 5% level, and * significance at the 10% level.

Table IV
Heterogeneity Analysis: Maximum Interest Rate Chargeable by Pawnbrokers in a State

	(1)	(2)	(3)
	Theft Crime (Pooled)		
	Baseline	Below Median	Above Median
Pawnshops	21.81**	1.010	44.40***
	(8.711)	(9.435)	(12.94)
Average maximum interest	16.5	12	23.6
Pawnshops mean	5.5	4.4	7.1
Outcome mean	2,891	2,797	3,037
Observations	13,729	8,364	5,365
Counties	1,400	800	600

Note: This table investigates the heterogeneous effects of pawnshops on crime. Column 1 shows the baseline focusing on the sample of states restricting the maximum interest rate. Columns 2 and 3 show the results dividing the sample using the median of the maximum interest rate allowed in a state. All regressions include county and year fixed effects. Regressions are weighted by population. Crime and pawnshops are per 100,000 persons. Standard errors are clustered at the county level. *** significance at the 1% level, ** significance at the 5% level, and * significance at the 10% level.

Table V
Pawnshops, Theft Crimes, and Gold Prices

	(1) Theft Crime (Pooled)	(2) Burglary	(3) Larceny	(4) Robbery
Pawnshops ($t=0$) × gold prices	0.339	1.126***	-0.840	0.0533
	(1.742)	(0.429)	(1.471)	(0.161)
Pawnshops	14.30**	3.071**	11.33**	-0.103
	(6.188)	(1.553)	(4.649)	(0.474)
Observations	19,049	19,049	19,049	19,049
Counties	1,899	1,899	1,899	1,899

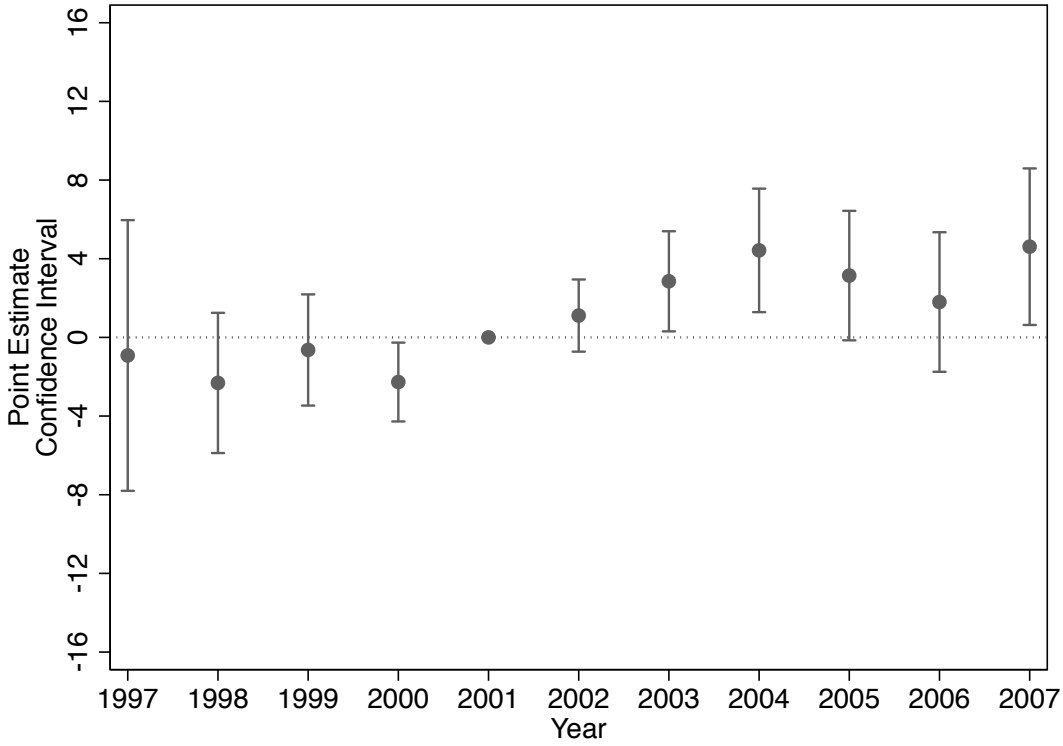
Notes: This table shows the results obtained interacting gold prices with the rate of pawnshops in a county fixed to the first year of the sample (period $t=0$). I report the results for the pooled measure of theft crimes, and by the type of theft crime (burglary, larceny, and robbery). All regressions include pawnshops at time t, county and year fixed effects. Regressions are weighted by population. Crime and pawnshops are per 100,000 persons. Standard errors are clustered at the county level. *** significance at the 1% level, ** significance at the 5% level, * and significance at the 10% level.

Table VI
Pawnshops, Theft Crimes, and Gold Prices: Robustness Checks

	(1)	(2)	(3)	(4)	(5)
			Burglary		
Pawnshops (*t=0*) × gold prices	0.964**	1.126***	1.091***	1.626***	0.891*
	(0.415)	(0.429)	(0.423)	(0.477)	(0.529)
Pawnshops		3.071**	2.758*	2.623*	2.599**
		(1.553)	(1.466)	(1.427)	(1.113)
Observations	19,049	19,049	19,049	19,049	19,049
Counties	1,899	1,899	1,899	1,899	1,899
Year FE	YES	YES	YES	YES	NO
County FE	YES	YES	YES	YES	YES
Pawnshops	NO	YES	YES	YES	YES
County observables	NO	NO	YES	YES	YES
County observables (t=0) × gold prices	NO	NO	NO	YES	YES
State-by-year FE	NO	NO	NO	NO	YES

Notes: This table examines the robustness of the estimates. Outcome of the analysis is burglary. Column 1 includes year fixed effects and county fixed effects. Column 2 adds pawnshops at time *t*. Column 3 adds all county covariates. Column 4 adds gold prices interacted with all socioeconomic controls, burglary, and share of burglaries on all crime committed (all fixed in the first year of the sample). Column 5 includes state-by-year fixed effects that absorb year fixed effects. Regressions are weighted by population. Crime and pawnshops are per 100,000 persons. Standard errors are clustered at the county level. *** significance at the 1% level, ** significance at the 5% level, and * significance at the 10% level.

Figure 1: Event Study Analysis



APPENDIX A: FOR ONLINE PUBLICATION

Table A1
Collateral by Category (Carter and Skiba 2012)

Category	Observations	Relative %	Average Loan	Standard Deviation
Jewelry	199,288	49.98%	$96.28	105.02
TVs/electronics	126,297	31.68%	$58.80	62.34
Tools/equipment	31,600	7.93%	$50.18	60.67
Household items	10552	2.65%	$42.92	44.7
Missing	7,833	1.96%	$63.75	72.54
Guns	7,734	1.94%	$146.97	98.75
Instruments	7,700	1.93%	$116.92	104.66
Camera/equipment	4,052	1.02%	$75.85	77.87
Miscellaneous	3,666	0.92%	$51.50	62.46

Note: This table reports the number of loans for each collateral category, the percentage of observations, and the average amounts and standard deviations of the items pawned for each category. All amounts are in 2002 US dollars. The sample of observations is from a pawnshop lender in Texas between 1997 and 2002 (Carter and Skiba 2012).

Table A2
Items stolen during burglaries (Burrel and Wellsmith 2010)

Cash	40%	Documents	5%
Jewellery	31%	Ornaments	5%
Audio	25%	Food	5%
VCR	17%	Tools	5%
TV	17%	Furniture	3%
Personal	12%	Cigarettes	3%
Telecom	12%	Vehicles	2%
Computer	11%	Cycle	2%
Photographic	11%	DVD	2%
Games	10%	Building	1%
Purse	10%	Garden	1%
Cards	10%	Digital	0%
Luggage	9%	Sports	0%
Clothing	9%	Antiques	0%
Domestic	7%		
Keys	6%		

Note: This table shows the percentage of the items stolen during burglaries. Police-recorded crime data are from the Sandwell Metropolitan Borough Council area of the West Midlands. The period covered goes from 1997 to 2003. The percentages do not add up to 100 due to the presence of stealing in multiple categories.

Table A3
Balancing Test

	(3) Outcome: Pawnshops
Banks and saving institutions	0.0028 (0.0114)
Deposits ($)	0.000 (0.000)
People below the poverty line	0.000 (0.000)
Percentage of unemployment	-2.20×10^{-7} (2.00×10^{-7})
Percentage of poverty	2.56×10^{-5} (1.93×10^{-5})
Income per capita	−0.000 (1.15×10^{-11})
RHS balancing test of joint significance	0.47
Observations	19,049
Counties	1,899

Note: This table shows the results of a balancing test investigating the socioeconomic determinants of pawnshops. The *F*-statistic indicates that the null hypothesis that the coefficients are jointly equal to zero cannot be rejected under the conventional significance levels. I include county and year fixed effects, and all county observables measuring population density, racial/ethnic composition, and male population aged between 15 and 24. Standard errors are clustered at the county level. Regressions are weighted by county population. *** significance at the 1% level, ** significance at the 5% level, and * significance at the 10% level.

Table A4
Pawnshops and Crime (Including Socio-Economic Controls)

	(1) Equation (1)	(2) + Controls
Panel A: Theft Crimes (Pooled)		
Pawnshops	13.83**	12.77**
	(6.281)	(5.757)
Outcome mean = 3,367.9		
Panel B: Motor-Vehicle Thefts		
Pawnshops	0.264	0.490
	(1.366)	(1.186)
Outcome mean = 455.9		
Panel C: Violent Crimes (Pooled)		
Pawnshops	-2.530	-2.919
	(2.980)	(2.850)
Outcome Mean = 1,357.8		
Observations	19,049	19,049
Counties	1,899	1,899
Year FE	YES	YES
County FE	YES	YES
Controls	NO	YES

Note: Each panel reports the results of the effects of pawnshops on a separate crime. Theft crime (pooled) includes larceny, burglary, and robbery. These are crimes whose loot might be sellable to a pawnshop. Violent crime (pooled) includes murder, rape, and assault. Column 1 shows equation (1). Column 2 adds all socio-economic controls. These include: population density, male population aged between 15 and 24, share of white Hispanics, white non-Hispanics, blacks, Asians, and American Indians; income per capita, percentage of people below the poverty line, percentage of unemployment; commercial banks and saving institutions, and amount of banking and saving deposits. Pawnshops and crimes are per 100,000 persons. Standard errors are clustered at the county level and are displayed in parenthesis. Regressions are weighted by population. *** significance at the 1% level, ** significance at the 5% level, and * significance at the 10% level.

Table A5
Pawnshops and Theft Crimes: Further Robustness Checks

	(1) Baseline	(2) 1st Percentile Population	(3) 2nd Percentile Population	(4) 1st Percentile Pawnshops	(5) 2nd Percentile Pawnshops	(6) Initial Population
Pawnshops	13.83**	17.93***	18.23***	15.02**	15.51**	12.09**
	(6.281)	(5.857)	(5.811)	(6.522)	(6.638)	(5.328)
Observations	19,049	18,867	18,672	18,862	18,677	19,049
Counties	1,899	1,882	1,864	1,880	1,861	1,899

	(7) County-Level Imputed Data	(8) Including Years 2008 to 2010	(9) No Agencies Spanning Multiple Counties
Pawnshops	20.86**	15.45***	17.38***
	(9.741)	(5.656)	(6.459)
Observations	28,416	24,747	16,080
Counties	2,158	1,947	1,695

Note: This table tests the robustness of the effects of pawnshops on theft crime. Column 1 shows the baseline specification (pooled measure estimated in Table II, column 2, panel A). I then exclude from the sample the top first and second percentiles of the population distribution in a county (columns 2 to 3) and of the pawnshop distribution (columns 4 to 5). Distributions are computed in the first year of the sample. Column 6 shows the results obtained from constructing pawnshop rates using population fixed in the first year of the sample. Column 7 uses UCR county-level aggregated data. Column 8 includes data from 2008 to 2010. Column 9 excludes counties that contain agencies spanning multiple counties. All of the specifications include county and year fixed effects and are weighted by population. Crime and pawnshops are per 100,000 persons. Standard errors are clustered at the county level. *** significance at the 1% level, ** significance at the 5% level, and * significance at the 10% level.

Table A6
Pawnshops, Gold Prices, and Burglaries: Further Robustness Checks

	(1) Baseline	(2) 1st Percentile Population	(3) 2nd Percentile Population	(4) 1st Percentile Pawnshops	(5) 2nd Percentile Pawnshops	(6) Excluding First Year in the Sample	(7) Perfectly Balanced Panel
Pawnshops ($t = 0$) × gold prices	1.126***	1.110***	1.206***	1.209***	1.253***	1.100***	1.483**
	(0.429)	(0.408)	(0.412)	(0.456)	(0.473)	(0.420)	(0.699)
Pawnshops	3.071**	3.847***	4.203***	3.285**	3.328**	2.470*	4.106**
	(1.553)	(1.482)	(1.451)	(1.600)	(1.632)	(1.279)	(2.093)

	(8) County-Level Imputed Data	(9) Including Years 2008 to 2010	(10) No Agencies Spanning Multiple Counties	(11) Log (1+ burglary)	(12) State of the Economy
Pawnshops (t = 0) × gold prices	0.716***	0.857***	1.043**	0.00120**	1.187**
	(0.239)	(0.247)	(0.497)	(0.000516)	(0.467)
Pawnshops	4.386*	3.739***	3.543**	0.00210	3.701**
	(2.439)	(1.380)	(1.649)	(0.00185)	(1.463)

Note: This table provides further robustness checks for estimating equation (2). Column 1 shows the baseline specification, as in Table VI, column 2. Then, I exclude from the sample the top first and second percentiles of the county population distribution (columns 2 to 3) and of the pawnshop distribution (columns 4 to 5). Distributions are computed in the first year of the sample. Column 6 excludes observations in the first year of the sample to avoid the mechanical correlation between pawnshops measured in the first year of the sample and crime in that year. Column 7 shows results when the analysis is conducted on a perfectly balanced panel of agencies (890 agencies* 11 years = 9,790 observations). Column 8 uses UCR county-level aggregated data. Column 9 includes data from 2008 to 2010. Column 10 excludes counties containing agencies spanning multiple counties. Column 11 shows regression where the outcome is ln (1+burglary rate per 100,000 persons). Column 12 includes pawnshops at time 0 interacted with US GDP and unemployment. All regressions include pawnshops, county and year fixed effects and are weighted by population. Burglary and pawnshops are per 100,000 persons. Standard errors are clustered at the county level. *** significance at the 1% level, ** significance at the 5% level, and * significance at the 10% level.

Table A7
Pawnshops, Burglaries, and the South Asian and American Indian Communities

	(1)	(2)	(3)	(4)
	Burglary			
	Share South Asian		Share American Indian	
	Below Median	Above Median	Below Median	Above Median
Pawnshops ($t = 0$) × gold prices	0.480	1.375**	0.307	1.138**
	(0.535)	(0.567)	(0.613)	(0.492)
Pawnshops	0.911	5.069*	4.467	0.920
	(1.175)	(3.077)	(2.723)	(1.500)
Observations	9,532	9,517	9,525	9,524
Mean population share	0.00098	0.0088	0.002	0.035

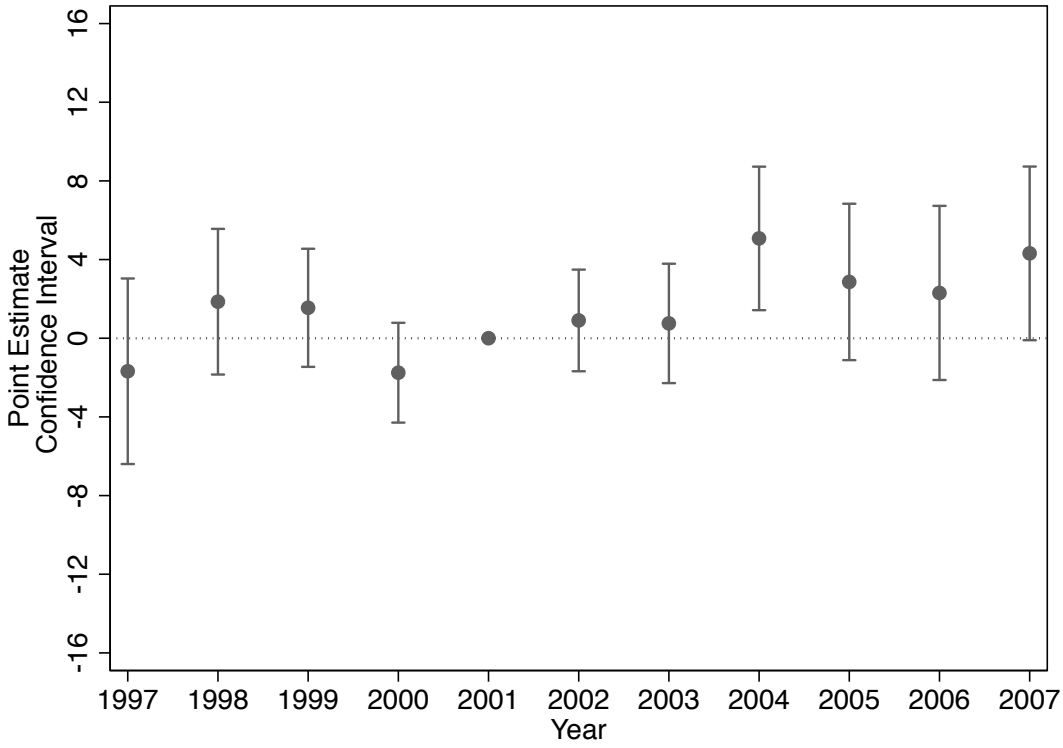
Note: I split the sample using the median of the South Asian share in a county (columns 1 and 2) and the median of the American Indians share in a county (columns 3 and 4). South Asians populations include: Afghanistan, Bangladesh, India, Iran, Pakistan, Cambodia, Indonesia, Laos, Malaysia, Philippines, Thailand, Vietnam, and other south east and south-central Asian countries. Data are retrieved from the 2000 census file: nhgis0020_ds151_2000_county. All regressions also include county and year fixed effects. Regressions are weighted by population. Crime and pawnshops are per 100,000 persons. Standard errors are clustered at the county level. *** significance at the 1% level, ** significance at the 5% level, * and significance at the 10% level.

APPENDIX FIGURES: NOT FOR PUBLICATION UNLESS OTHERWISE REQUESTED

Figure A1: Pawnshops and Gold

Figure A2: The ‘Refinement’ Process

Figure A3: Event Study Analysis



APPENDIX B: FOR ONLINE PUBLICATION

I have retrieved the maximum interest rates chargeable by pawnbrokers in a state by implementing an online search. Two aspects of this search are worth mentioning. First, to facilitate comparisons across states, I followed Caskey (1991) and Miles (1997) in calculating the maximum charge, including interest and fees, on a two-month $100 pawn. Second, state regulations for the period of analysis might be subject to change. Because past regulations are publicly available only for a subset of states, I complemented my search by comparing the interest rates with three separate works reporting historical information on pawnbrokers' state laws. Miles (1997) offers a snapshot of 1996; Pindus (2011) reports information from 2004 to 2009; Carter (2012) reports the interest rates in 2009. The maximum interest rates display no variation over time. Appendix Table B1 shows the final outcome for the search. Twelve US states did not regulate interest rates over this period. The states of Massachusetts and Colorado are excluded because cities and municipalities can apply their own regulations. Also, I consider only the period from 2004 to 2007 for Alaska and Montana because the status of the regulation prior to 2004 is discordant across various sources of information. In states where this regulation was enacted, the minimum interest rate was 2%, the maximum 25%. Below are links to the pawnbrokers' state regulations.

Links to pawnbrokers' state regulations

ALABAMA
http://www.banking.alabama.gov/pdf/Laws/Pawn_Shop_Act.pdf

ALASKA
https://www.commerce.alaska.gov/web/Portals/5/pub/PawnbrokersStatutes.pdf

ARIZONA
http://az.elaws.us/ars/44-1626

ARKANSAS
https://law.justia.com/codes/arkansas/2010/title-12/subtitle-2/chapter-12/subchapter-1/12-12-103

CALIFORNIA
http://www.easylawlookup.com/California-Law/Finance-Code/par-7709/_easylookup.blp?GO=Prepare&site=easy&print=&data=finance&p_start=344&p_end=349&p_para=7709&p_epara=7821&par=7709&displayer=YES

COLORADO
https://www.sos.state.co.us/CCR/GenerateRulePdf.do?ruleVersionId=5619

CONNECTICUT
https://www.cga.ct.gov/current/pub/chap_409.htm

DELAWARE
http://delcode.delaware.gov/title24/title24.pdf

DISTRICT OF COLUMBIA
https://beta.code.dccouncil.us/dc/council/code/sections/47-2884.09.html

FLORIDA
http://www.leg.state.fl.us/Statutes/index.cfm?App_mode=Display_Statute&URL=0500-0599/0539/0539.html

GEORGIA
https://dbf.georgia.gov/pawnshops-title-pawn

HAWAII
http://www.honolulumagazine.com/core/pagetools.php?pageid=8120&url=/Honolulu-Magazine/November-2010/Hawaii-039s-Pawn-Stars/&mode=print

IDAHO
Not Found

ILLINOIS
http://www.ilga.gov/legislation/ilcs/ilcs3.asp?ActID=1188&ChapAct=205%26nbsp%3BILCS%26nbsp%3B510%2F&ChapterID=20&ChapterName=FINANCIAL+REGULATION&ActName=Pawnbroker+Regulation+Act%2E

INDIANA
http://iga.in.gov/static-documents/c/9/2/c/c92cc141/TITLE28_AR7_ch5.pdf

IOWA
Not Found

KANSAS
http://kslegislature.org/li_2012/b2011_12/statute/016_000_0000_chapter/016_007_0000_article/016_007_0019_section/016_007_0019_k/

KENTUCKY
https://www.yundle.com/laws/kentucky/pawn-shop-laws/pawnbroker-regulations-in-kentucky

LOUISIANA
http://legis.la.gov/legis/Law.aspx?d=93478

MAINE
http://www.maine.gov/pfr/consumercredit/licensing/pawnbroker/Pawnlaw.htm

MARYLAND
https://law.justia.com/codes/maryland/2010/business-regulation/title-12

MASSACHUSSETTS
https://www.mass.gov/service-details/approved-pawnbroker-regulations-and-interest-rates

MICHIGAN
http://www.legislature.mi.gov/(S(cx051zqpn0a1q3jp0ggtlyfo))/mileg.aspx?page=getObject&objectName=mcl-446-209

MINNESOTA
https://www.revisor.mn.gov/laws/?id=404&year=1996&type=0

MISSISSIPPI
http://www.dbcf.ms.gov/documents/cons_finance/pawnshopact.pdf

MISSOURI
http://revisor.mo.gov/main/OneSection.aspx?section=367.021&bid=19844&hl=

MONTANA
https://www.yundle.com/laws/montana/pawn-shop-laws/montana-pawnbrokers

NEBRASKA
http://nebraskalegislature.gov/laws/browse-chapters.php?chapter=69

NEVADA
https://www.leg.state.nv.us/Division/Legal/LawLibrary/Statutes/69th/Stats199717.html#Stats199717page2546

NEW HAMPSHIRE
http://www.gencourt.state.nh.us/rsa/html/XXXVI/398/398-11.htm

NEW JERSEY
http://www.nj.com/politics/index.ssf/2014/01/nj_assembly_passes_bill_allowing_pawn_brokers_to_charge_higher_interest_rates.html

NEW MEXICO
https://law.justia.com/codes/new-mexico/2011/chapter56/article12/section56-12-13/

NEWYORK
https://www.rit.edu/cla/criminaljustice/sites/rit.edu.cla.criminaljustice/files/docs/WorkingPapers/2012/2012-12.pdf

NORTH CAROLINA
http://www.ncleg.net/enactedlegislation/statutes/pdf/bysection/chapter_66/gs_66-393.pdf

NORTH DAKOTA
https://www.yundle.com/laws/north-dakota/pawn-shop-laws

OHIO
http://codes.ohio.gov/orc/4727

OKLAHOMA
https://www.ok.gov/okdocc/documents/1.%20Oklahoma%20Pawnshop%20Act.pdf

OREGON
https://www.oregonlaws.org/ors/726.390

PENNSYLVANIA
http://www.dobs.pa.gov/Documents/Statutes/Pawnbrokers%20License%20Act.pdf

RHODEISLAND
https://law.justia.com/codes/rhode-island/2013/title-19/chapter-19-26/section-19-26-18/

SOUTH CAROLINA

http://www.scstatehouse.gov/code/t40c039.php

SOUTH DAKOTA
Not Found

TENNESSEE
http://ctas-eli.ctas.tennessee.edu/printpdf/book/export/html/399

TEXAS
http://www.statutes.legis.state.tx.us/Docs/FI/htm/FI.371.htm

UTAH
https://le.utah.gov/xcode/Title13/Chapter32A/C13-32a_1800010118000101.pdf

VERMONT
http://legislature.vermont.gov/statutes/fullchapter/09/097

VIRGINIA
https://law.justia.com/codes/virginia/2010/title-54-1/chapter-40/54-1-4008/

WASHINGTON
http://apps.leg.wa.gov/rcw/default.aspx?cite=19.60&full=true#19.60.020

WEST VIRGINIA
http://www.legis.state.wv.us/Bill_Status/bills_text.cfm?billdoc=sb35%20intr.htm&yr=2012&sesstype=RS&i=35

WISCONSIN
https://docs.legis.wisconsin.gov/statutes/statutes/138

WYOMING
https://law.justia.com/codes/wyoming/2011/title40/chapter14/section40-14-360/

Table B1
Maximum Interest Rate Chargeable by Pawnbrokers: Regulation by State (1997-2007)

State	Regulated	Interest Rate
ALABAMA	1	25
ALASKA	2004	20
ARIZONA	1	13.5
ARKANSAS	0	Not Regulated
CALIFORNIA	1	12
COLORADO	Excluded	Excluded
CONNECTICUT	1	2
DISTRICT OF COLUMBIA	1	2
DELAWARE	0	Not Regulated
FLORIDA	1	25
GEORGIA	1	25
HAWAII	1	20
IDAHO	0	Not Regulated
ILLINOIS	1	20
INDIANA	1	23
IOWA	0	Not Regulated
KANSAS	1	10
KENTUCKY	1	22
LOUISIANA	1	15
MAINE	1	25
MARYLAND	0	Not Regulated
MASSACHUSETTS	Excluded	Excluded
MICHIGAN	1	4
MINNESOTA	1	23
MISSISSIPPI	1	25
MISSOURI	0	Not Regulated
MONTANA	2004	25
NEBRASKA	0	Not Regulated
NEVADA	1	10
NEW HAMPSHIRE	0	Not Regulated
NEW JERSEY	1	4
NEW MEXICO	1	7
NEW YORK	1	4
NORTH CAROLINA	1	22
NORTH DAKOTA	0	Not Regulated
OHIO	1	9
OKLAHOMA	1	20
OREGON	1	11
PENNSYLVANIA	1	4
RHODE ISLAND	1	5
SOUTH CAROLINA	1	23
SOUTH DAKOTA	0	Not Regulated
TENNESSEE	1	12
TEXAS	1	20
UTAH	0	Not Regulated
VERMONT	1	4
VIRGINIA	0	Not Regulated
WASHINGTON	1	10
WEST VIRGINIA	0	Not Regulated
WISCONSIN	1	3
WYOMING	1	20

Note: This table summarizes state-level regulations of the maximum interest rate chargeable by pawnbrokers. I could not retrieve the exact regulations for Massachusetts and Colorado. Also, I consider only the period from 2004 to 2007 for Alaska and Montana because the status of the regulations prior to 2004 is discordant across various sources of information.

APPENDIX C: FOR ONLINE PUBLICATION

Changes in the local availability of pawnshops, which provide credit to people possibly facing financial adversities, may foster or may be correlated to changes in the local use of addictive drugs. The proliferation of addictive substances—in turn—can incentivize theft crimes needed to sustain the drug habit. To explore this possibility, I include the estimated rate of death from drug poisoning, including both illicit and prescription drugs in the analysis, as a local proxy for drug usage. Estimates come from the Center for Disease Control and Prevention (CDC) National Center for Health Statistics (NCHS) and are public available at https://www.cdc.gov/nchs/data-visualization/drug-poisoning-mortality/. The county-level annual data are available from 1999 onwards. These data are binned below 30 deaths per 100,000 in bins of size 1.9, and counties with estimated rates over 30 are coded as "30+".[37] In order to conduct the analysis, I use non-parametric controls for bins size (i.e. one dummy for each bin, including 17 different categories). Table C1 presents the results. Column 1 shows the baseline estimates obtained on a panel that starts in 1999 as drug related deaths are unavailable prior to that date. Column 2 includes the set of non-parametric controls. If anything, the estimated coefficient is slightly larger compared to the baseline, with $p<.01$. This suggests that the proliferation of illegal drugs is unlikely to be a major driver of the effects of pawnshops on acquisitive crimes.

[37] Deaths are classified using the International Classification of Diseases, Tenth Revision (ICD–10). Drug-poisoning deaths are defined as having ICD–10 underlying cause-of-death codes X40–X44 (unintentional), X60–X64 (suicide), X85 (homicide), or Y10–Y14 (undetermined intent).

Table C1
Controlling for Drug-Related Deaths

	(1) Baseline	(2) + Drug-Related Deaths
Pawnshops	11.77** (4.656)	12.26*** (4.640)
Observations	15,916	15,916
Counties	1,898	1,898
Year FE	YES	YES
County FE	YES	YES
Drug-Relates Deaths	NO	YES

Notes: This table provides further robustness checks of the effects of pawnshops on theft crimes. Column 1 shows the baseline. Column 2 adds non-parametric controls for bins size of drug-related death rates (i.e. one dummy for each bin, including 17 different categories). All regressions include county and year fixed effects. The sample starts from 1999 because annual county-level death rates are unavailable prior to that date. Standard errors are clustered at the county level. *** significance at the 1% level, ** significance at the 5% level, and * significance at the 10% level.

APPENDIX D: FOR ONLINE PUBLICATION

Appendix D examines the time series properties of pawnshops by implementing a Harris-Tzavalis unit-root test, by estimating a time series autoregressive model, and by estimating an equation in first differences.

Tab D1
Harris-Tzavalis Unit-Root Test for Pawnshops

	Statistic	z	p-value
Rho	0.522	-32.456	0.000

Notes: This table shows the results of the Harris-Tzavalis unit-root test for pawnshops. The test rejects the presence of non-stationarity.

Table D2
Time Series Autoregressive Model

	(1) Pawnshops
Pawnshops (t-1)	0.479*** (0.0215)
Pawnshops (t-2)	-0.0289 (0.0176)
Observations	15,236
Counties	1,875

Notes: I show results of an autoregressive model including pawnshops rate at t-1 and t-2. The estimating equation includes county and year fixed effects. Standard errors are clustered at the county level. *** significance at the 1% level, ** significance at the 5% level, and * significance at the 10% level.

Table D3
Estimating Equation in First Differences

	(1)	(2)
	Theft Crimes	
	Level	First Differences
Pawnshops	8.304*	8.463**
	(4.246)	(3.895)
Observations	17,141	17,141
Counties	1,890	1,890

Notes: I show result in level where dependent and independent variables are expressed in levels (column 1) and in fist differences (column 2). To allow comparability across estimates I use the same sample in both estimations (as the first difference estimation automatically excludes one year of data). Both regressions include county and year fixed effects. Standard errors are clustered at the county level. *** significance at the 1% level, ** significance at the 5% level, and * significance at the 10% level.